



Ladder Safety

Background: Injuries relating to ladder use have resulted in over 75 workers' compensation claims with loss costs of \$1.3M since the Fund's inception, an average of \$17,700 per claim. The month of March has been designated as **National Ladder Safety Month**, an ideal time to focus on this common injury cause.

Choosing the Right Ladder

Ladders are built from one of three basic materials; wood, fiberglass and metal (aluminum).

The environment of your work site is the first factor in choosing the material from which your ladder is constructed. For example, if you are working near sources of electricity, a metal ladder should be rejected since aluminum is an electrical conductor. Your body can complete an electrical circuit between the electrical power source, the ladder, and then to the ground in the event of a live wire contact incident. An electrical shock while working from a ladder can trigger a fall or cause your heart to stop leading to serious injury or death. On the other hand, if there are no electrical power sources in your work area, the aluminum ladder is the lightest weight when compared to fiberglass or wood.

There are also several kinds of ladders manufactured for a variety of uses. Again, evaluation of your work environment and knowledge of what ladders are available will allow you to choose the right ladder for the job. Each of the following considerations addresses safety issues in your work environment:

- Will the ladder be resting on an uneven surface?
- Is the work area crowded with people and/or materials?
- What obstructions are in the path of the climb?

Next, the proper ladder length must be selected. It is unsafe to use a ladder that is too long or too short. When using a **Step Ladder**, for example, standing on the top cap or the step below the top cap is not permitted due to the increased likelihood of losing your balance. Likewise, when using an **Extension Ladder**, the top three rungs are not to be used for climbing. A **Straight Ladder** is too long, for example, if ceiling height prohibits the ladder from being set-up at the proper angle. Likewise, an **Extension Ladder** is too long if the ladder extends more than three (3) feet beyond the upper support point. In this case, the portion of the ladder that extends above the upper support point can act like a lever and cause the base of the ladder to move or slide out. Safety standards require a label on the ladder to indicate the highest standing level.

Next, consider the Duty Rating of the ladder. This is an indication of the maximum weight capacity the ladder can safely carry. To figure out the total amount of weight your ladder will be supporting, add:

- Your Weight; plus
- The Weight of Your Clothing and Protective Equipment; plus
- The Weight of Tools and Supplies You Are Carrying; plus
- The Weight of Tools and Supplies Stored on the Ladder

There are five categories of ladder Duty Ratings:

- Type IAA (Extra Heavy Duty) 375 pounds
- Type IA (Extra Heavy Duty) 300 pounds
- Type I (Heavy Duty) 250 pounds
- Type II (Medium Duty) 225 pounds
- Type III (Light Duty) 200 pounds

The Duty Rating of your ladder can be found on the specifications label. Safety standards require a Duty Rating sticker to be placed on the side of every ladder. Do not assume that a longer ladder has a higher weight capacity. There is no relationship between ladder length and weight capacity.

Ladder Varieties

Your work environment, including the physical size restrictions, is probably the most important factor in determining the variation of ladder to use for a given job. The versatility of the ladder, however, is a major consideration, especially for domestic use.

Otherwise, the number of ladders that one would need to have available for the wide variety of tasks around the home that require elevation from the ground would be prohibitive. In an effort to assist in familiarizing yourself with the standard ladder variations that are available, consider the following:

Articulated Ladder

An **Articulated Ladder** is a portable ladder with one or more pairs of locking hinges which allow the ladder to be set up in several configurations such as a single or extension ladder, with or without a stand-off, a stepladder, a trestle ladder, scaffold or work table. Each pair of articulated joints in the ladder can be locked in one or more positions to accommodate the various configurations. The locking positions of the hinges allow set-up at the proper angles to accommodate each configuration that the manufacturer has designated.



An instruction label appears on each Articulated Ladder illustrating the locking hinges in both the locked and unlocked positions. Each Articulated Ladder manufacturer has a unique locking hinge design and each lock must visibly indicate whether it is locked or unlocked. As a result, it is important that the user become familiar with the proper operation of the hinge and make sure all the hinges are locked before using the ladder. Never attempt unlocking or repositioning any of the hinges while standing on the ladder.

The hinges of an Articulated Ladder require periodic lubrication. The hinges should be lubricated upon receipt of the ladder and then annually or more frequently, depending upon use. When involved in messy work, place a covering over the exposed hinge mechanisms to avoid getting contaminants into them that may cause malfunctions. Another on-product label illustrates all the acceptable configurations for a given Articulated Ladder. Configurations not illustrated on the label are not to be used.

The size of an Articulated Ladder is determined when it is set up in the stepladder configuration by measuring along the front side rail from the bottom to the center of the hinge at the top of the ladder. When set up in the stepladder configuration, Articulated Ladders range in size from 3 to 15 feet maximum. When set up as a Single or Extension Ladder, Articulated Ladders may have a length of no more than 30 feet.

All four feet of an Articulated Ladder are covered with a slip-resistant material which must be present and in good condition before the ladder is used. The ladder must not be used on ice, snow or slippery surfaces unless suitable means to prevent slipping is employed. The ladder must never be placed upon other objects such as boxes, barrels, scaffolds, or other unstable bases in an effort to obtain additional height. Articulated Ladders must not be tied or fastened together with any other type of ladder to provide a longer length.

Proper Care

A thorough inspection must be made when the ladder is initially purchased and each time it is placed into service. Clean the climbing and gripping surfaces if they have been subjected to oil, grease or slippery materials. Working parts, bolts, rivets, step-to-side rail connections, and the condition of the anti-slip feet (safety shoes) shall be checked.

Ladders exposed to excessive heat, as in the case of fire, may have reduced strength. Similarly, ladders exposed to corrosive substances such as acids or alkali materials may experience chemical corrosion and a resulting reduction in strength. Remove these ladders from service.

Broken or bent ladders, and ladders with missing or worn out parts must be taken out of service and marked, for example, "Dangerous – Do Not Use" until repaired by a competent mechanic or destroyed. No attempt shall be made to repair a ladder with a defective side rail. Ladders with bent or broken side rails must be destroyed.

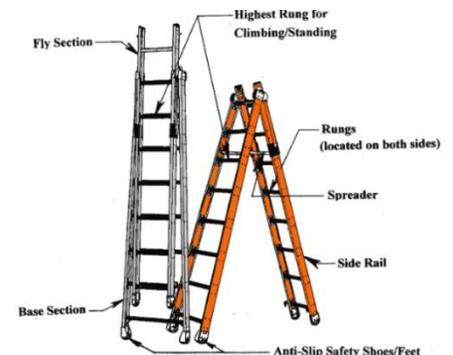
In the event a ladder is discarded, it must be destroyed in such a manner as to render it useless. Another person must not be given the opportunity to use a ladder that has been deemed unsafe.

When transporting ladders on vehicles equipped with ladder racks, the ladders must be properly supported. Overhang of the ladders beyond the support points of the rack should be minimized. The support points should be constructed of material such as wood or rubber-covered pipe to minimize the effects of vibration, chafing and road shock. Securing the ladder to each support point will greatly reduce the damaging effects of road shock.

Storage racks for ladders not in use should have sufficient supporting points to avoid sagging which can result in warping the ladder. Other materials must not be placed on the ladder while it is in storage.

Combination Ladder

A **Combination Ladder** is a portable ladder capable of being used as Stepladder, or as a Single or Extension Ladder. It may also be capable of being used as a Trestle Ladder or as a Stairwell Ladder. Its components may be used as Single Ladders. This type of ladder can be designed with either steps or rungs, and the inclusion of a pail shelf is optional. When steps are present, the ladder should be erected so that the step surfaces



Combination Ladder
(shown left to right: Extension Ladder and Trestle Ladder)

are horizontal. Either spreaders or a locking device can be used to securely hold the front and rear sections in the open position.

When used in the Single or Extension Ladder Mode:

Selection of proper Single or Extension Ladder size requires knowledge of the height of the top support point. In the event the top support point is a roof eave, the top of the ladder must extend approximately three feet above the roof eave if the climbers' intent is to access the roof. The ladder must also be tied to the upper access level before climbing onto or off the ladder at the upper level. The user must take care when getting on or off the ladder at the upper level in order to avoid tipping the ladder over sideways or causing the ladder base to slide out.

Single and Extension Ladders should be erected as close to a pitch of 75 1/2 degrees from the horizontal as possible for optimum resistance against the bottom of the ladder sliding out, strength of the ladder, and balance of the climber. A simple rule for setting-up the ladder at the proper angle is to place the base a distance from the wall or upper support equal to one-quarter of the length of the ladder side rails.

The top of a Single or Extension Ladder must be placed with the two side rails equally supported unless the ladder is equipped with a single-support attachment for situations such as a pole light standard, building corner or in-tree type operation such as pruning or fruit picking. When it is necessary to support the top of the ladder at a window opening, a device should be attached across the back of the ladder and extending across the window to provide firm support against the building walls or window frames.

In cases where the work site imposes a height restriction on the ladder length, the user may find that longer ladders are not capable of being set-up at the proper 75 1/2 degrees angle. To safeguard against the bottom of the ladder sliding out, select a shorter Extension or Single Ladder.

There are also situations where the use of a particular ladder length creates a gap in the height of a wall that can be reached by the user. For example, a 14-foot Single or Extension Ladder cannot be used to work on a wall below a certain height because the user would be too far out from the wall. Usually, the lower portion of the wall can be reached from the ground up to a height of about 7 feet. When working from the 14-foot Single or Extension Ladder, working from the ladder below 10-feet becomes a problem. These conditions create a gap between 7 and 10-feet in height where another ladder selection is recommended. To work in this zone, a shorter self-supporting ladder such as a Stepladder configuration should be considered.

In an effort to avoid losing your balance and falling off a Single or Extension Ladder, the user must not step or stand higher than the step indicated on the label marking the highest standing level.

When used as a Stepladder:

A Stepladder requires level ground support for all four of its side rails. If this work site condition does not exist, the Stepladder configuration should not be selected for the job.

In order to prevent tipping the ladder over sideways due to over-reaching, the user must climb or work with the body near the middle of the steps or rungs. The ladder should be set-up close to the work. Never attempt to move the ladder without first descending, relocating the ladder, and then re-climbing. Do not attempt to mount the ladder from the side or step from one ladder to another unless the ladder is secured against sideways motion.

In an effort to avoid losing your balance and falling off the Stepladder, the user must not step or stand higher than the step indicated on the label marking the highest standing level. The user must also not step or stand on the bucket/pail shelf, if so equipped.

When ascending or descending the ladder, always face the ladder and maintain a firm hand hold. Do not attempt to carry other objects in your hand(s) while climbing.

Refer to the manufacturer's instructions with regard to whether more than one person is permitted on the Combination Ladder at the same time when in the Stepladder or Trestle Ladder configuration.

When used as a Stairwell Ladder:

When used as a self-supporting Stairwell Ladder, a Combination Ladder must not be climbed on its back section.

Proper Care

A thorough inspection must be made when the ladder is initially purchased and each time it is placed into service. Clean the climbing and gripping surfaces if they have been subjected to oil, grease or slippery materials. Working parts, bolts, rivets, step-to-side rail connections, and the condition of the anti-slip feet (safety shoes) shall be checked.

Ladders exposed to excessive heat, as in the case of fire, may have reduced strength. Similarly, ladders exposed to corrosive substances such as acids or alkali materials may experience chemical corrosion and a resulting reduction in strength. Remove these ladders from service.

Broken or bent ladders, and ladders with missing or worn out parts must be taken out of service and marked, for example, "Dangerous – Do Not Use" until repaired by a competent mechanic or destroyed. No attempt shall be made to repair a ladder with a defective side rail. Ladders with bent or broken side rails must be destroyed.

In the event a ladder is discarded, it must be destroyed in such a manner as to render it useless. Another person must not be given the opportunity to use a ladder that has been deemed unsafe.

When transporting ladders on vehicles equipped with ladder racks, the ladders must be properly supported. Overhang of the ladders beyond the support points of the rack should be minimized. The support points should be constructed of material such as wood or rubber-covered pipe to minimize the effects of vibration, chafing and road shock. Securing the ladder to each support point will greatly reduce the damaging effects of road shock.

Storage racks for ladders not in use should have sufficient supporting points to avoid sagging which can result in warping the ladder. Other materials must not be placed on the ladder while it is in storage.

Ladder-type Step Stool is a self-supporting, foldable, portable ladder that is non-adjustable in length, 32-inches or less in overall size, with flat steps and without a pail shelf. It is designed so that the ladder Top Cap as well as all steps can be climbed on. The side rails may continue above the top cap. It is intended for use by one person.

The length of a Ladder-type Step Stool is measured along the front side rail from the feet at the bottom to the top cap. Any side rail extensions on the stool are not considered part of the Step Stool size.

Proper Use

A Ladder-type Step Stool requires level ground support for all four of its side rails. If this work site condition does not exist, a Ladder-type Step Stool should not be selected for the job.

A Ladder-type Step Stool must not be used unless its base is spread fully open and the Spreaders locked. Ladder-type Step Stools are not to be used as Single Ladders or in the partially open position.

In order to prevent tipping the Step Stool over sideways due to over-reaching, the user must climb or work with the body near the middle of the steps or top cap. The Step Stool should be set-up close to the work. Never attempt to move the Step Stool without first descending, relocating the Step Stool, and then re-climbing. Do not attempt to mount the Step Stool from the side or step from one ladder or Step Stool to another unless the Step Stool is secured against sideways motion.

When ascending or descending the Step Stool, always face the Step Stool. The braces on the rear of a Step Stool are not intended for climbing or standing and must not be used for that purpose. The anti-slip feet at the bottom of the Step Stool side rails must be present and in good condition prior to using. The Step Stool must not be used on ice, snow or slippery surfaces unless suitable means to prevent slipping is employed.

A Step Stool must never be placed upon other objects such as boxes, barrels, scaffolds, or other unstable bases in an effort to obtain additional height.

To protect children, do not leave a Step Stool set up and unattended.

Proper Care

A thorough inspection must be made when the Step Stool is initially purchased and each time it is placed into service. Clean the climbing and gripping surfaces if they have been subjected to oil, grease or slippery materials. Working parts, bolts, rivets, step-to-side rail connections, and the condition of the anti-slip feet (safety shoes) shall be checked. If structural damage, missing parts, or any other hazardous defect is found, the Step Stool must not be placed into service and either discarded or competently repaired.

Step Stools exposed to excessive heat, as in the case of fire, may have reduced strength. Similarly, Step Stools exposed to corrosive substances such as acids or alkali materials may experience chemical corrosion and a resulting reduction in strength. Remove these Step Stools from service.

Step Stools with bent or broken side rails must be destroyed.

In the event a Step Stool is discarded, it must be destroyed in such a manner as to render it useless. Another person must not be afforded the opportunity to use a Step Stool that has been deemed unsafe.

Do not store other materials on the Step Stool while it is in storage.

Stepladder

The **Stepladder** is a self-supporting portable ladder that is non-adjustable in length, with flat steps and a hinged design for ease of storage. It is intended for use by one person.

Stepladders range in size from 4 ft. to 20 ft. in length along the side rail. Stepladders shorter than 4 ft. are considered Step Stools. The highest standing level on a step ladder is slightly more than 2 ft. from the top of the ladder. The highest standing level is required to be marked on the specifications label on the side rail of the product. Therefore, when planning your job, the maximum work height is established by adding the user's height and reach to the highest standing level of the stepladder.



Proper Use

A Stepladder requires level ground support for all four of its side rails. If this work site condition does not exist, a stepladder should not be selected for the job.

A Stepladder must not be used unless its base is spread fully open and the Spreaders locked. Stepladders are not to be used as Single Ladders or in the partially open position.

In order to prevent tipping the ladder over sideways due to over-reaching, the user must climb or work with the body near the middle of the steps. The ladder should be set-up close to the work. Never attempt to move the ladder without first descending, relocating the ladder, and then re-climbing. Do not attempt to mount the ladder from the side or step from one ladder to another unless the ladder is secured against sideways motion.

In an effort to avoid losing your balance and falling off the stepladder, the user must not step or stand higher than the step indicated on the label marking the highest standing level. The user must also not step or stand on the Top Cap or bucket/pail shelf.

When ascending or descending the ladder, always face the ladder and maintain a firm hold. Do not attempt to carry other objects in your hand(s) while climbing.

The braces on the rear of a stepladder are not intended for climbing or standing and must not be used for that purpose. Note, however, that special stepladders are available with steps on both the front and rear and are intended for two users at the same time.

The anti-slip feet at the bottom of the stepladder side rails must be present and in good condition prior to using the ladder. The ladder must not be used on ice, snow or slippery surfaces unless suitable means to prevent slipping is employed.

A stepladder must never be placed upon other objects such as boxes, barrels, scaffolds, or other unstable bases in an effort to obtain additional height.

Proper Care

A thorough inspection must be made when the ladder is initially purchased and each time it is placed in to service. Clean the climbing and gripping surfaces if they have been subjected to oil, grease or slippery materials. Working parts, bolts, rivets, step-to-side rail connections, and the condition of the anti-slip feet (safety shoes) shall be checked. If structural damage, missing parts, or any other hazardous defect is found, the ladder must not be placed into service and either discarded or competently repaired.

Ladders exposed to excessive heat, as in the case of fire, may have reduced strength. Similarly, ladders exposed to corrosive substances such as acids or alkali materials may experience chemical corrosion and a resulting reduction in strength. Remove these ladders from service.

Ladders with bent or broken side rails must be destroyed.

In the event a ladder is discarded, it must be destroyed in such a manner as to render it useless. Another person must not be afforded the opportunity to use a ladder that has been deemed unsafe.

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Storage racks for ladders not in use should have sufficient supporting points to avoid sagging which can result in warping the ladder. Other materials must not be placed on the ladder while it is in storage.

If you have any questions or would like additional information, please contact your risk management consultant, or NJPHA-JIF safety director, Jim Rhoads at 610-937-2694 or by e-mail at james_rhoads@pmagroup.com.

References:

American Ladder Institute (www.laddersafetytraining.org)

IMPORTANT NOTICE - The information and suggestions presented by PMA Insurance Group in this risk control technical guide are for your consideration in your loss prevention efforts. They are not intended to be complete or definitive in identifying all hazards associated with your business, preventing workplace accidents, or complying with any safety related or other laws or regulations. You are encouraged to alter the information and suggestions to fit the specific hazards of your business and to have your legal counsel review all of your plans and company policies.